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Nutritional issues in Spanish women; findings of the ANIBES Study

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Abstract

Introduction: **women have proved vulnerable with regard to their nutritional status at all stages of life and in a variety of physiological situations. In response to the need for more up-to-date and accurate information about the determinants of nutritional status and the quantification of diet specifically, the ANIBES (Anthropometry, Intake and Energy Balance in Spain) study was carried out among a representative group of Spaniards aged 9 to 75.**

Objective: **to describe and evaluate some of the results available on energy intake and food sources from the ANIBES Study related to Spanish women.**

Methods: **using a representative sample (n = 2 009, 996 women/1 013 men) of the Spanish population (9-75 years old), the following studies were conducted: anthropometry, diet (using new technology –tablet computers), physical activity (using accelerometry and a validated questionnaire), and perceptions regarding different aspects related to food, nutrition, physical activity and energy balance.**

Results: **energy intake was 1 660 ± 426.7 kcal/d, significantly lower than among males. When analysed by age group, only girls (9-12 years old) and adolescents (13-17 years old) meet the recent recommendations established by the European Food Safety Authority (EFSA). In particular, the average energy intake among older women (65-75 years old), 1 476 ± 359.9 kcal/d, is problematic with regard to adequate nutritional density. The caloric profile is unbalanced (17% E from protein; 41.2% from carbohydrates; 38.7% from lipids) for all age groups. The main source of energy comes from grains and their derivatives (27%), meat products and their derivatives (14.1%), oils and fats (13.1%) and milk and its derivatives (12.4%).**

Discussion: **the results are presented in tables and charts in accordance with their potential repercussions for the nutritional quality of the Spanish female diet to-**

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PROBLEMÁTICA NUTRICIONAL EN LA POBLACIÓN FEMENINA ESPAÑOLA; RESULTADOS DEL ESTUDIO ANIBES

Resumen

Introducción: **la mujer presenta una situación de vulnerabilidad en su estado nutricional a lo largo de las diferentes etapas de la vida y las diversas situaciones fisiológicas. La necesidad de información lo más actualizada y precisa sobre los determinantes del estado nutricional, y de manera específica la cuantificación de la dieta, ha dado lugar al Estudio ANIBES ("Antropometría, Ingesta y Balance Energético en España"), en una población española representativa de entre 9 y 75 años.**

Objetivo: **describir y evaluar algunos de los resultados disponibles de ingesta energética y fuentes alimentarias en la población femenina española, derivados del Estudio ANIBES.**

Métodos: **en una muestra representativa (n = 2.009, 996 mujeres/1.013 hombres) de la población española (9-75 años), se ha determinado antropometría, estudio de la dieta mediante nuevas tecnologías (*"tablets"*), actividad física mediante acelerometría y cuestionario validado, así como un estudio de percepción sobre diferentes aspectos de la alimentación, la nutrición, la actividad física y, en definitiva, del balance energético.**

Resultados: **la ingesta energética ha sido de 1.660 ± 426,7 kcal/d, significativamente inferior a la de la población masculina. Cuando se analiza por grupos de edad, solo las niñas (9-12 años) y adolescentes (13-17 años) alcanzan las recientes recomendaciones establecidas por EFSA. De manera especial, la ingesta media observada de energía en las mujeres más mayores (65-75 años), 1.476 ± 359,9 kcal/d refleja dificultades para una adecuada densidad nutricional. El perfil calórico es desequilibrado (17% E a partir de proteína; 41,2% de hidratos de carbono; 38,7% para los lípidos), y lo es para todos los grupos de edad. La principal fuente energética la constituyen los cereales y derivados (27%), los productos cárnicos y derivados (14,1%), los aceites y grasas (13,1%) y la leche y derivados (12,4%).**

Discusión: **los resultados se discuten de manera esquemática de acuerdo a su potencial repercusión en la calidad nutricional de la dieta de la mujer española actual, la**

day, and compared with other Spanish and European studies.

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comparación con otros estudios en nuestro país, así como el entorno europeo.

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Palabras clave: *Estado nutricional de la mujer. Estudio ANIBES. Ingesta de energía. Fuentes alimentarias de energía.*

Introduction

It is quite clear at this time that nutritional needs and a susceptibility to certain pathologies related to nutrition are often specific to women.[1] The energy and nutritional needs of women vary with age and stage of life. One notable example regards the aging process. On the one hand, women have a longer life expectancy than men, and it appears that factors like diet and lifestyle have a positive impact on this phenomenon. On the other hand, a longer life does not necessarily mean that the aging process has been a healthy one with a good quality of life. On the contrary, problems like osteoporosis, some types of cancer and neurodegenerative illnesses are increasing as a consequence of a longer lifespan among females.[2,3] Additionally, one of the main concerns of women across different stages of life is controlling body weight. This often entails following diets and engaging in practices that could be deemed *magic diets*, with a whole host of related myths regarding nutrition, which compromise their nutritional status. The consequences are clear: malnutrition due to excessive consumption, which results in overweight and obesity and at the other extreme, malnutrition due to insufficiency, with nutritional disorders that can result in pathologies like anorexia and bulimia.[4] Also important are those chronic illnesses that are common in women and can often be prevented by a healthy diet and lifestyle: diabetes mellitus, cardiovascular illnesses and estrogenic cancers.[2,3] In fact, the latest Spanish National Health Survey (ENS as per its Spanish acronym)[5] showed that 71.3% of women positively evaluated their health as opposed to 79.3% of men. However, does this slightly optimistic subjective perception correspond to reality? It is estimated that 1 out of every 6 adults over 15 years old in Spain suffer from chronic health problems and that these are much more common among women: migraines or frequent headaches, chronic back pain, depression, arthrosis and arthritis, among others. Additionally, notwithstanding the longer lifespan of women in Spain, only a small percentage of women over 65 are functionally autonomous (47.7%), while the number for men is much higher (61.3%).

Unfortunately, no specific, representative studies have been done that specifically evaluate the nutritional status of women, its determinants and different life stages and physiological situations.[6,7] Indeed, the information available comes from studies of the general population regardless of sex.[6,7] In this respect, the ANIBES[8] (Anthropometry, Intake and Energy Balance in Spain) study was quite recently carried out among a representative sample of the Spanish population aged 9 to 75, using new technologies to study diet, physical activity and anthropometry. This article presents the data from the ANIBES Study related to the female participants and compares and discusses this information in the context of other studies of Spanish women.

Objective

To describe the results found for the women who participated in the ANIBES Study and analyse the positive and negative findings regarding energy intake by age group, from 9 to 75 years. It also compares the results obtained with different studies of Spaniards and Europeans and with the results obtained for men.

Methods

The methodology used in the ANIBES Study has been previously described in detail.[8] The study represents the first time that a research project of this nature has been carried out using innovative tools (such as tablet computers to record food and beverage intake and accelerometers to validate and quantify the level of physical activity) to obtain accurate information about food and energy intake, eating habits, behaviour and anthropometric data among the Spanish, as well as energy expenditure and physical activity patterns.

In short, the study included a representative sample of people living in Spain (excluding the autonomous cities of Ceuta and Melilla) between 9 and 75 years old. Specifically, the sample comprises 2009 people. The distribution by sex (50.4% men and 49.6% women) reflects the distribution of men and women in Spain. The fieldwork for the ANIBES Study was done over the course of three months, from september to november 2013, following the completion of two pilot studies.

The diet study was done by recording food intake for 3 days (2 workdays and 1 weekend day), using a tablet computer to gather information about each participant's consumption, including a description of the dishes, accompanied by photographs, and information about leftovers. The information on food and beverage intake was transformed into energy and nutrients using the VD-FEN 2.0 database, based on the food composition tables by Moreiras *et al*.,[9] with various additions

and updates. The data obtained was grouped into 16 food groups, 29 subgroups and 761 ingredients for later analysis. The analysis of the quality of the daily food intake was based on the nutritional goals established for the Spanish population (SENC, 2011).[10] Additionally, data provided by manufacturers, nutritional information on labels and a photographic atlas of food products were used to assign a weight according to the portion sizes.

Results

The average energy intake for the ANIBES group is shown in Table I. As a group, women had significantly lower intakes (1 660 ± 426.7 kcal/d) than men (1 957 ± 531 kcal/d; $p < 0.05$). When analysed by age group, important differences can be seen between female children, adolescents, adults and the elderly, with a particularly reduced intake seen in the last group (1 476 ± 359.9 kcal/d). An analysis of the caloric profile of women in Spain (Table II) shows that 17.0% of the energy intake comes from proteins, 41.2% from carbohydrates (17.8% in the form of simple sugars) and 38.7% from lipids. The lipid profile (Table II) shows that 11.7% of the energy intake comes from saturated fatty acids (SFA), 16.9% from monounsaturated fatty acids (MUFA) and 6.6% from polyunsaturated fatty acids (PUFA). Finally, 1.4% of the energy intake comes from alcohol and 1.2% from dietary fibre.

When the group is broken down by age, the percentage of total energy intake that comes from proteins increases with age (Table II), a pattern that is not observed with carbohydrates or lipids.

Figure 1 shows the percentage contribution from different food and beverage groups to the energy intake of Spanish women. The largest amount (27%) comes from grains, of which bread comprises 11.0% E. This is followed by meat products and their derivatives (14.1%), oils and fats (13.1%) and milk and its derivatives (12.4%), all of which together comprise approximately two thirds of total intake. Individually, the foods and beverages that contribute the most to energy intake among women are: bread (11.0%), olive oil (9.8%), meat (8.8%), bakery products and pastries (7.1%), milk (5.3%), fruit (5.3%), sausages and other meat derivatives (5.2%), grains and flour (4.5%), vegetables (4.3%), ready-to-serve meals (3.8%) and pasta (3.4%), all of which comprise more than 70% of the total.

Discussion

Clearly, there is a transition underway in eating habits and nutrition, which can be seen in western societies, especially in Spain,[11-13] and even more so among women. This is largely due to the still recent full incorporation of women into the workplace and changes in their values and priorities. It is also well known that in all animal species, females –whether consciously or not– usually have food and lifestyle patterns that are more suited to their needs despite the different nutritional challenges they face over the course of their lives, which are much greater than those faced by men. Moreover, women have a longer life expectancy, although this does not necessarily imply a better quality of life during their extra years. In fact, a situation of dependence, loss of functional autonomy, and the presence of risk factors and pathologies associated with nutrition are much more common in women.[5] For this reason, it is essential to have up-to-date and accurate information about the nutritional status of women in Spain, to know and understand the strong points and weak points and to establish preventative measures and, when necessary, treatments specific to women.[7] The ANIBES Study makes it possible to evaluate a representative sample of Spanish women aged 9 to 75 using innovative technologies to evaluate their nutritional status.

The average energy intake observed in the recent ANIBES Study is lower than that found by other studies such as ENIDE (National Survey on Dietary Intake in Spain),[13] which was conducted at national level in 2011 among men and women aged 18 to 64, although the methodology used to evaluate dietary intake was different.

The ANIBES results are also lower than those found by the Food Consumption Panel,[14] although in this case, intake may have been overestimated, since the Panel, unlike the ANIBES Study, did not register food discards. In any case, and regardless of the study, there is a marked tendency to decrease energy intake during the final years which, however, has not had an impact on obesity rates among adult Spanish women (16%), although this figure is two points below that found for the male population in the last National Health Survey.[5] In the case of children and youth (2-17 years), obesity rates are 9.6% for both sexes and rise to 27.8% when overweight and obesity are combined. Low weight numbers among women are also notable: 3.4% for women older than 18 years and 14% among children and youth, a risk factor for possible food disorders and associated pathologies, which are all too common among young girls and teenagers. In this respect, energy intake in P25 of the ANIBES female group (9-12) is only 1 600 kcal/d, and just over 1 500 kcal/d in the case of adolescents (13-17). There is no doubt that among vulnerable groups, and during periods of anabolic growth like childhood and adolescence, these values may compromise an adequate nutritional status. Similarly, the low average intake seen among older adult women (65-75 years) is a source of concern, remaining as it does below 1 500 kcal/d, considered the minimum intake to fulfil nutritional density dietary principles.[15] Within this elderly group, intake does not reach >1 600 kcal/d until P75.

Table I
Total energy intake, and by sex and age group. ANIBES Study

Energy (kcal/d)	*Total**				*Children 9-12**				*Adolescents 13-17**				*Adults 18-64**				*Elderly 65-75**			
	n	*Average*	*SD*	*SEM*	*n*	*Average*	*SD*	*SEM*	*n*	*Average*	*SD*	*SEM*	*n*	*Average*	*SD*	*SEM*	*n*	*Average*	*SD*	*SEM*
Total	2009	**1810**	*504.4*	11.25	213	**1960**	*431.3*	29.6	211	**2018**	*508.1*	35.0	1655	**1816**	*512.0*	12.6	206	**1618**	*448.4*	31.2
Men	1013	**1957**	*531.0*	16.68	126	**2006**	*456.1*	40.6	137	**2124**	*514.6*	44.0	798	**1966**	*543.2*	19.2	99	**1771**	*484.7*	48.7
Women	996	**1660**	*426.7*	13.52	87	**1893**	*385.5*	41.3	74	**1823**	*435.7*	50.6	857	**1675**	*436.9*	14.9	107	**1476**	*359.9*	34.8

SD: standard deviation from the average; SEM: standard error of measurement.
*significant difference (≤0.05) by sex.

Table II
Caloric profile and nutrient distribution among Spanish women. ANIBES Study

	Total			*Children*			*Adolescents*			*Adults*			*Elderly*		
	9-75			*9-12*			*13-17*			*18-64*			*65-75*		
	Total	*Men*	*Women*	***Total***	*Men*	*Women*	***Total***	*Men*	*Women*	***Total***	*Men*	*Women*	***Total***	*Men*	*Women*
n	**2009**	1013	996	**213**	126	87	**211**	137	74	**1655**	798	857	**206**	99	107
Average Energy Intake (kcal/d)	**1810**	**1957**	**1660**	**1960**	**2006**	**1893**	**2018**	**2124**	**1823**	**1816**	**1966**	**1675**	**1618**	**1771**	**1476**
(%) Proteins	**16.8***	16.7	17.0	**16.0**	16.3	15.6	**16.2**	16.4	15.9	**16.9**	16.8	17.0	**17.1**	16.9	17.3
(%) Carbohydrates	**41.1**	41.0	41.2	**43.8**	43.4	44.4	**44.4**	43.9	45.2	**40.7**	40.6	40.9	**40.7***	39.6	41.7
(%) Sugars	**17.0***	16.3	17.8	**18.8**	18.8	18.8	**17.7***	16.9	19.2	**16.7***	16.0	17.3	**18.3***	16.7	19.8
(%) Lipids	**38.5**	38.2	38.7	**38.9**	39.0	38.6	**38.1**	38.4	37.5	**38.6***	38.2	39.0	**37.2**	37.0	37.4
(%) SFA	**11.7**	11.6	11.7	**13.1**	13.2	12.9	**12.5**	12.6	12.2	**11.7**	11.5	11.8	**10.6**	10.5	10.7
(%) MUFA	**16.8**	16.6	16.9	**16.0**	16.1	15.8	**15.7**	15.9	15.4	**16.8***	16.6	17.0	**17.1**	17.0	17.2
(%) PUFA	**6.63**	6.6	6.6	**6.4**	6.3	6.5	**6.4**	6.4	6.5	**6.7**	6.6	6.7	**6.2**	6.2	6.1
(%) *n*-6	**5.40**	5.43	5.37	**5.44**	5.36	5.55	**5.53**	5.53	5.54	**5.45**	5.48	5.43	**4.90**	4.87	4.92
(%) *n*-3	**0.63**	0.72	0.55	**0.44**	0.43	0.45	**0.45**	0.45	0.46	**0.66**	0.77	0.55	**0.62**	0.66	0.57
(%) Alcohol	**1.9***	2.5	1.4	**0.0**	0.0	0.0	**0.0**	0.0	0.1	**2.1***	2.8	1.5	**2.7***	4.1	1.4
(%) Fibre	**1.4***	1.4	1.5	**1.2***	1.2	1.3	**1.2**	1.2	1.2	**1.4***	1.4	1.5	**1.8**	1.8	1.9

SFA: saturated fatty acids. MUFA: monounsaturated fatty acids. PUFA: polyunsaturated fatty acids. *n*-6: fatty acids *n*-6. *n*-3: fatty acids *n*-3.
*significant difference (p ≤ 0.05) by sex.

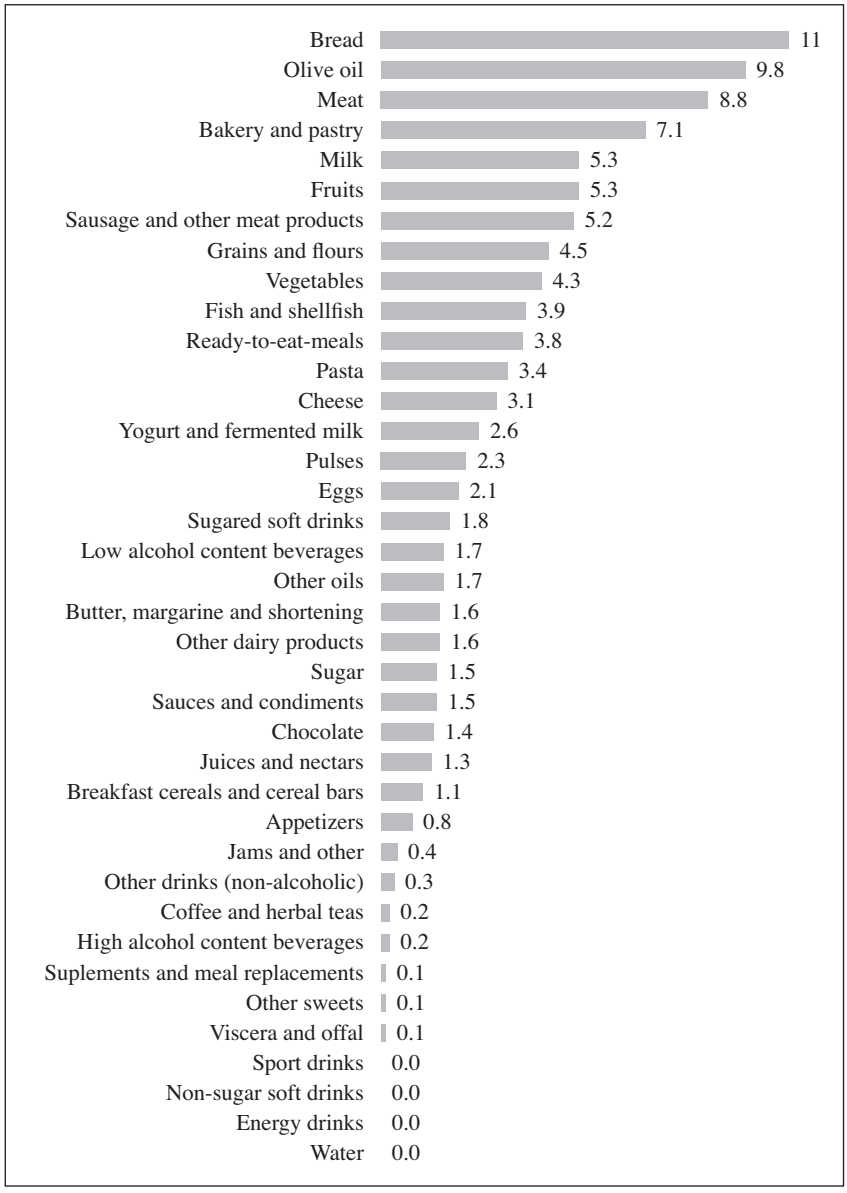

Fig. 1.—Dietary sources of energy (% kcal/day/person) from food and beverage groups and subgroups in spanish women (9-75 years): ANIBES Study.

One dietary quality index is the so-called *caloric profile*, which is unbalanced among Spanish women today, who have an excess of protein intake, an insufficient carbohydrate intake, especially in the form of complex carbohydrates, and an excess of lipids. This imbalance in the diet occurs in all age groups, although it is most marked among the elderly. On the other hand, there is almost no difference in the pattern observed for men and it is consistent with the results found by other studies like ENIDE[13] and the Food Consumption Panel.[14] Neither is there much difference between the Spanish population and other European countries, which range for protein from 11.1-17.6%, according to the European Nutrition and Health Report.[16] In the case of lipids (% energy), the EFSA has proposed a wide acceptable range (20-35%),[15] but the Spanish women in the ANIBES Study exceed even the upper limit, which can be associated with a higher risk of overweight/obesity and cardiovascular illness.[17] The lipid profile is not within the recommendations either (6-10% recommended for saturated fatty acids (SFA), depending on the organization issuing the report),[15-17] with an elevated intake of SFA at 11.7%. In the ANIBES group, the intake of monounsaturated fatty acids (MUFA) is 16.9% and higher in elderly women, a consequence of higher consumption of olive oil as the basic culinary fat. The FAO/WHO recommends an intake of 16-19%E MUFA,[17] while the recent PREDIMED study[18] showed the desired consumption of MUFA at 20-25% E. In the case of PUFA, in 2010,[17] the FAO/WHO recommended an intake of 6-10%, and in Spain, the SENC[10] suggested 5% in 2011. The intake among the women in the ANIBES

group, therefore, can be considered correct (6.6%), although the intake of eicosapentaenoic (EPA) and docosahexaenoic (DHA) omega-3 fatty acids is insufficient.

The results obtained for the intake of carbohydrates in different European countries range from 43-58% E among children and adolescents and 36-56% in adults.[16] Therefore, the ANIBES group is not only below the recommended amount, but in the lowest range.

With regard to energy sources, it is notable that grains and their derivatives are the main, although still insufficient contributors, which reflects the aforementioned low contribution of complex carbohydrates and fibre. In fact, it would be beneficial to implement educational campaigns on nutrition to eradicate many of the myths and correct the mistakes regarding food products like bread, especially among women. The ANIBES results also show an elevated intake of meats and their derivatives, which may be contributing to the unbalanced diet.

In conclusion, the nutritional situation of Spanish women should be a priority for the Spanish health system and nutritional education for all of the age groups analysed in the ANIBES Study. Indeed, at this time, the study is the best tool available to evaluate nutritional status using new technologies.

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